

What is claimed is:

CLAIMS:

1 1. A vibratory separator for separating components of
2 material introduced thereto, the vibratory separator comprising

3 a basket

4 a collection receptacle beneath the basket,

5 a deck on the basket for mounting a screen assembly
6 thereon, the deck having a plurality of deck pins projecting
7 upwardly therefrom,

8 a screen assembly on the deck, the screen assembly
9 comprising screening material,

10 the screening material having a plurality of
11 openings therethrough suitable for the flow of fluid
12 therethrough, the fluid from the material introduced into the
13 basket,

14 the screening material having a plurality of spaced
15 apart screen holes therethrough, each screen hole having
16 therein part of one of the deck pins,

17 vibratory apparatus connected to the vibratory
18 separator for vibrating the screen assembly,

19 holding apparatus for holding the screen assembly on
20 the deck with a part of a deck pin in each screen hole.

1 2. The vibratory separator of claim 1 wherein the screening
2 material comprises a plurality of layers of screen mesh.

1 3. The vibratory separator of claim 1 wherein the vibratory
2 separator is a shale shaker and the material includes drilling
3 fluid with drilled cuttings entrained therein.

1 4. The vibratory separator of claim 1 further comprising
2 two side ledges on spaced-apart sides of the basket,
3 the side ledges positioned for supporting spaced-apart sides
4 of the screen assembly,

5 each side ledge having an upper surface inclined
6 downwardly from a basket side toward an interior of the
7 basket,

8 each deck pin projecting upwardly from one of the
9 side ledges, and

10 two spaced-apart edges of the screen assembly each
11 having screen holes of the plurality of holes therethrough,
12 each of said edges of the screen assembly resting on one of
13 said upper surfaces.

1 5. The vibratory separator of claim 1 wherein the holding
2 apparatus includes two spaced-apart rails, each rail positioned
3 movably above one of the two side ledges, each rail selectively
4 movable downwardly to abut an edge of the screen assembly and to
5 push said edge against the upper surface of said side ledge thereby
6 bending said screen assembly so that said edges assume an
7 inclination corresponding to the inclined upper surface of said
8 corresponding side ledge, and the vibratory separator further
9 comprising

10 selectively movable apparatus for moving the rails
11 downwardly against said edges.

1 6. The vibratory separator of claim 5 wherein the deck
2 includes curved support for the screen assembly and the rails hold
3 edges of the screen assembly against the side ledges so that the
4 screen assembly is held in a crowned shape on said curved support.

1 7. The vibratory separator of claim 5 further comprising
2 each rail having a plurality of rail holes therein,
3 each rail hole located and configured for receiving a portion
4 of a deck pin when the rail abuts the screen assembly, said
5 deck pin also passing through an edge of the screen assembly.

1 8. The vibratory separator of claim 1 further comprising
2 the holding apparatus including two spaced-apart
3 rails, one rail on each of two spaced-apart sides of the
4 basket, each rail movable downwardly to abut an edge of the
5 screen assembly, and

6 movement apparatus connected to the basket for
7 selectively moving the rails down to abut the screen assembly.

1 9. The vibratory separator of claim 8 further comprising
2 power apparatus connected to the movement apparatus
3 for powering the movement apparatus for powered movement of
4 the rails.

1 10. The vibratory separator of claim 9 further comprising
2 the power apparatus including a plurality of
3 selectively movable piston apparatuses above each rail, each
4 selectively movable piston apparatus including a movable
5 piston with a lower end releasably connected to a
6 corresponding rail.

1 11. The vibratory separator of claim 9 further comprising
2 manually operable apparatus for selectively moving
3 the rails.

1 12. The vibratory separator of claim 9 wherein the power
2 apparatus is fluid powered by fluid under pressure.

1 13. The vibratory separator of claim 12 wherein the fluid
2 under pressure is from the group consisting of gas and hydraulic
3 fluid.

1 14. The vibratory separator of claim 1 wherein the deck pins
2 are inclined toward an interior of the basket and the holding
3 apparatus includes two spaced-apart side members, each side member
4 pushing down on an edge of the screen assembly thereby tensioning
5 the screening material.

1 15. The vibratory separator of claim 1 wherein the holding
2 apparatus includes a bladder system with inflatable bladder
3 apparatus for pushing down on spaced-apart edges of the screen
4 assembly to hold the screen assembly on the deck.

1 16. The vibratory separator of claim 15 wherein the bladder
2 apparatus directly contacts a top surface of the screening material
3 providing a seal between an interface of a lower surface of the
4 bladder apparatus and the top surface of the screening material.

2 17. The vibratory separator of claim 15 wherein the screen
3 assembly has two edge hooks, one edge hook at an outer part of each
4 spaced-apart edge of the screen assembly held down by the holding
5 apparatus, each edge hook releasably held within the basket.

1 18. The vibratory separator of claim 15 wherein the two
2 spaced-apart rails seal against a top surface of the screening
3 material.

1 19. A holding system for holding a screen assembly on a deck
2 of a vibratory separator, the vibratory separator having two
3 spaced-apart sides between which the screen assembly is held, the
4 deck including two side supports for supporting two spaced-apart
5 sides of the screen assembly, each side support having an upper
6 surface inclined downwardly from its respective vibratory separator
7 side toward an interior of the vibratory separator, the holding
8 system comprising

9 two spaced-apart rails, each rail located on a side
10 of the vibratory separator above an upper inclined surface of
11 a corresponding side support,

12 each rail selectively movable downwardly to hold an
13 edge of the screen assembly against an upper inclined surface
14 of a side support thereby inclining said edge to assume an
15 inclination corresponding to the upper inclined surface.

1 20. The holding apparatus of claim 19 wherein said rails have
2 holes and each side support has a plurality of pins spaced-apart
3 thereon and projecting upwardly therefrom from said upper surface,
4 said pins for projection through said screen assembly and into said
5 holes of said rails.

1 21. The holding apparatus of claim 19 wherein the rails hold
2 the screen assembly in sealing contact with the deck.

1 22. The holding apparatus of claim 19 wherein the screen
2 assembly comprises screening material and downward force of the
3 rails tensions the screening material of the screen assembly.

2 23. A support for a screen assembly in a vibratory separator,
3 the support comprising
4 a deck for supporting a screen assembly, the screen
5 assembly restable on the deck,
6 the deck having two spaced-apart side supports, each
7 of said side supports having an upper portion with an inclined
8 surface, each of said inclined surfaces inclined inwardly and
9 downwardly from an outer part of said deck toward an inner
10 part thereof,
11 each of said upper portions with an inclined surface
12 locatable beneath an outer edge of the screen assembly.

1 24. The support of claim 23 wherein each outer edge of said
2 screen assembly has at least one screen hole for receiving a
3 portion of a pin and the support further comprising
4 each of the two spaced-apart side supports having at
5 least one pin projecting upwardly therefrom, a portion of said
6 at least one pin positionable in said at least one screen
7 hole.

1 25. A screen assembly for a vibratory separator, the screen
2 assembly comprising
3 screening material having two spaced-apart outer
4 edges,
5 a plurality of spaced-apart holes in each of said
6 outer edges,
7 each of said holes located for receiving a portion
8 of a pin projecting therethrough.

1 26. The screen assembly of claim 25 wherein said pin
2 projects upwardly from a support beneath the screen assembly.
3

2 27. A method for holding a screen assembly in a vibratory
3 separator, the method comprising

4 installing a screen assembly on a deck of a
5 vibratory separator, the vibratory separator having two
6 spaced-apart sides between which a screen assembly is held,
7 the deck including two side supports for supporting two
8 spaced-apart sides of a screen assembly, each side support
9 having an upper surface inclined downwardly from its
10 respective vibratory separator side toward an interior of the
11 vibratory separator, and

12 holding the screen assembly in place with a holding
13 apparatus, the holding apparatus comprising a holding system
14 for holding the screen assembly on the deck of a vibratory
15 separator, the holding system comprising two spaced-apart
16 movable members, each located on a side of the vibratory
17 separator above an upper inclined surface of a side support,
18 and each movable member selectively movable to hold an edge
19 of the screen assembly against an upper inclined surface of a
20 side support thereby inclining said edge to assume an
21 inclination corresponding to the upper inclined surface.

1 28. The method of claim 27 wherein the movable members are
2 from the group consisting of inflatable bladders and side rails.

1 29. The method of claim 27 wherein the movable members seal
2 against a top surface of the screen assembly.

1 30. The method of claim 27 wherein the screen assembly has
2 screening material thereon and the movable members bend the screen
3 assembly thereby tensioning the screening material.

2 31. A method for processing material with a vibratory
3 separator, the method comprising

4 introducing material to be processed to a vibratory
5 separator, the vibratory separator comprising a basket, a
6 collection receptacle beneath the basket, a deck on the basket
7 for mounting a screen assembly thereon, the deck having at
8 least one deck pin projecting upwardly therefrom, and the
9 screen assembly comprising screening material, the screening
10 material having a plurality of openings therethrough suitable
11 for the flow of fluid therethrough, the fluid from the
12 material introduced into the basket, the screening material
13 having at least one screen hole therethrough, said screen hole
14 for receiving part of one of the at least one deck pin,
15 vibratory apparatus connected to the vibratory separator for
16 vibrating the screen assembly, holding apparatus for holding
17 the screen assembly on the deck with a part of said at least
18 one deck pin in said screen hole, and

19 separating components of the material with the
20 screen assembly.